# Alerts, Notices, and Case Reports

## Cactus Thorn Embedded in the Cartilaginous Proximal Tibia

MICHELLE A. STEVENS
THOMAS A. DE COSTER, MD
STEPHEN E. RENWICK, MD
*Albuquerque, New Mexico*

WE DESCRIBE the clinical course of a child with an unrecognized cactus thorn injury to his knee. This report highlights the difficulties of diagnosing and treating such injuries, difficulties that are important to primary care, emergency, and tertiary care physicians. These include the diagnosis of knee pain in children in general and cactus thorn injuries in particular. The consequences of thorn injuries are uncertain, depending on the unusual problems of thorn structure, operative technical challenges, and nonbacterial inflammation sequelae.

### Report of a Case

The patient, a 3-year-old boy, was referred with a painful mass on the anteromedial aspect of his knee and a diagnosis of "dislocated meniscus." The child had been in good health until four days before admission when he had the insidious onset of knee pain and no recollection of trauma. His physician had noted a tender lump near the medial joint line with mild swelling of the knee and mild restriction of motion. The patient had no constitutional symptoms of fever, weight loss, or other joint problems.

Additional history revealed that the child had fallen on a cactus seven days before admission, and at that time his father had removed five tiny (approximately 1 mm in length) thorns from the skin around the knee. On physical examination the epidermal thorn penetration sites were barely visible. There was a tender dome-shaped mass 3 cm in diameter over the proximal medial tibia with mild surrounding inflammation and no sign of overlying skin injury or a needle track (Figure 1). The patient had an antalgic gait and pain at the extreme of flexion (110 degrees) but painless full knee extension. McMurray's test was painful but negative for popping. Knee ligaments and tendons were normal. The musculoskeletal examination and the general examination otherwise showed no abnormalities. Plain radiographs at this time were also normal. The diagnosis was unclear, but possible causes of the mass considered were neoplasia, developmental abnormalities, inflammation, and trauma in the tissues of the knee region.

To better evaluate the location and tissue characteristics of the mass, magnetic resonance imaging (MRI) was done (Figure 2), and showed a 4 cm × 1 mm × 1 mm foreign body in the proximal tibial cartilaginous epiphysis extending superficially to the perichondrium. This signal was initially assessed to be an artifact, but on subsequent evaluation was interpreted as a cactus thorn. Also demonstrated in the MRI was a dome of inflammatory reactive tissue overlying the point of entry and corresponding in size to the mass on physical examination. All intraarticular structures including the medial meniscus were normal.

Chickenpox developed, resulting in a low-grade fever (37.8°C [100°F]), and the child was treated with acyclovir. This delayed the operative removal of the thorn, allowing observation of the natural history of this condition for an additional three days. The inflammatory mass increased in size by 10% and tenderness persisted, but there were no signs of infection of the tibia, knee joint, or lymphatics and no worsening of the fever (40°C maximum) or increased erythrocyte sedimentation rate (40 mm per hour maximum) presumably due to the chickenpox infection or a foreign body reaction.

With the patient under general anesthesia, the thorn was removed in the operating room by an incision directly over the center of the domed mass. The age of the child, the size of the thorn, and the possible difficulty in finding it precluded the use of local anesthesia. When the pseudocapsule was incised, the thorn presented itself and was extracted in one piece. The tract was gently debrided, the wound irrigated, and the skin closed. The thorn and debrided tissue were subjected to histologic and microbial analysis. All cultures (including fungal) were negative for pathogens. The incision healed uneventfully, and the swelling subsided over the ensuing six weeks. At two-year follow-up, knee function and appearance were normal by physical and radiographic examinations.

### Discussion

This case illustrates the problem of diagnosing knee pain in children and the difficulties associated with cactus thorn injuries. A wide range of diagnostic possibilities should be considered in a child with monoarticular symptoms, including developmental, neoplastic, infectious, inflammatory, and traumatic processes. Foreign body injuries are usually associated with histories of acute injury and apparent wounds, but this is not always the case with cactus thorn injuries.

Cactus thorns have a wide variety of forms and shapes that cause several characteristic clinical problems.[1] Multiple superficial thorns are painful and difficult to remove. Single thorns can be sharper than surgical needles and can penetrate beneath the skin, often leaving minimal tracks and making diagnosis and localization difficult. Many

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From the Department of Orthopaedics and Rehabilitation, University of New Mexico School of Medicine, Albuquerque.

Reprint requests to Thomas A. DeCoster, MD, Dept of Orthopaedics and Rehabilitation, University of New Mexico Medical Center, 2211 Lomas Blvd NE, ACC Bldg 2W, Albuquerque, NM 87131-5296.

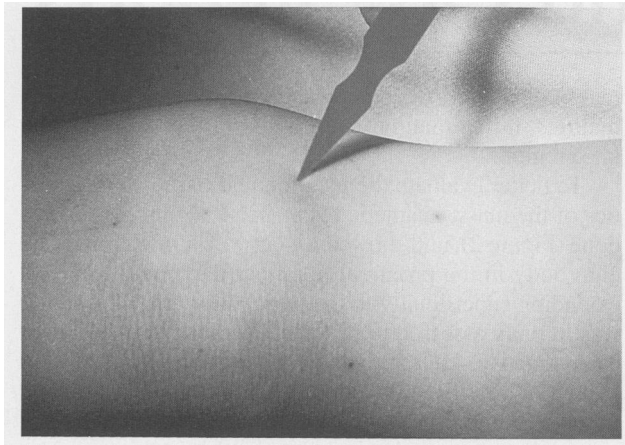

**Figure 1.**—On the initial presentation, a mass was noted at the anteromedial aspect of the right knee without a needle track or skin lesion indicating trauma.

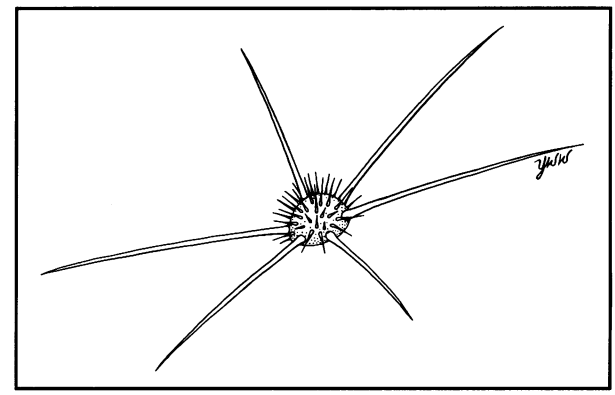

**Figure 3.**—An *Echinocerus pectinatus* shows distinctly different thorn types. The small thorns are difficult to remove because of the large number that usually superficially embed in the skin. A large thorn can deeply embed, such as in this case, without leaving a visible skin mark.

cactus species have two varieties of thorns (Figure 3), including the species in this case, *Echinocerus pectinatus*. In this patient, the small (1 mm in length) thorns removed from the skin were distinctly smaller than the surgically removed 40-mm thorn from the same plant, a fact that clouded the diagnosis. The MRI of the thorn showed a thin dark line that does not approximate any normal pathologic disorder and was initially interpreted as artifact, so the importance of this case extends as well to radiologists and other physicians interpreting magnetic resonance images.

The literature identifies a variety of types of microbiologic and antigen-induced inflammation as sequelae of embedded cactus thorns.[2-7] Although fungal contamination of thorns can cause infections, this is unusual, as is consistent with this case. This case was typical in that an active inflammatory response to the thorn was present, but no bacteria were identified. Synovitis has been reported as a response to a cactus thorn in the knee joint,[8] as well as tendinitis and myositis from soft tissue penetration.[9,10] Most reports of cactus thorns describe thorns embedded in the foot, knee joint, or upper extremity. The unusual location of this thorn in the patient's cartilaginous epiphysis serves to illustrate the sharpness and strength of the cactus thorn, characteristics often underestimated. This location is also relevant as a possible cause of growth abnormality or chronic infection.

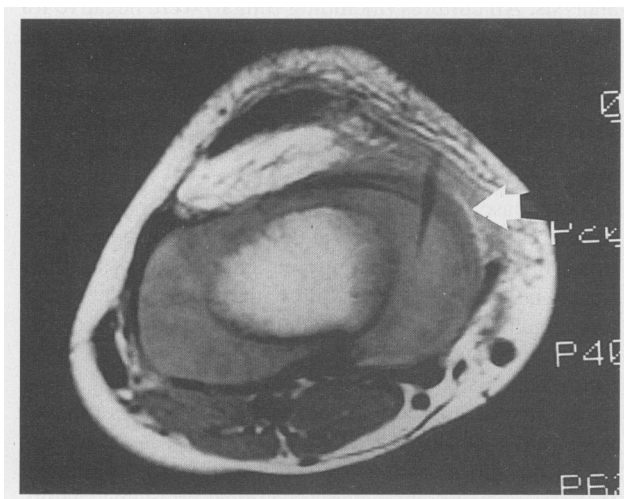

**Figure 2.**—The patient's T2-weighted transverse plane magnetic resonance image shows a conical foreign body signal in the cartilaginous tibial epiphysis that was initially interpreted as artifact.

Reports of operative treatment of embedded thorns have prominently mentioned difficulties in finding and removing the thorns from soft tissue and joints.[1,11,12] Cactus thorns are radiolucent and cannot be localized or distinguished from surrounding soft tissue by plain radiography. A thorn in the knee joint is difficult to find on surgical exploration. The MRI was helpful in making the diagnosis and localizing the thorn. These results support the use of MRI when cactus thorn foreign bodies are considered in the differential diagnosis, especially when surgical removal is planned.

The observed worsening condition, operative finding of localization, and good short- and long-term results demonstrated in this patient all show the appropriateness of operative treatment. The risk of cartilaginous infection or cartilaginous growth abnormality cannot be determined from this report, but the outcome supports the use of debridement, as performed in this case. Although most common in the southwestern United States, cactus thorn injuries can occur anywhere due to the prevalence of ornamental cacti in households across the country, making cactus thorn foreign body penetration a candidate for differential diagnosis regardless of locale.

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# Mixed Bacterial Meningitis in a 4-Year-Old Girl

KULKANYA CHOKEPHAIBULKIT, MD
*Knoxville, Tennessee*

YEE-SIN LEO, MD
ALEC E. WITTEK, MD
*Los Angeles, California*

REPORTS OF MIXED BACTERIAL MENINGITIS date back to the early 1930s. Recent data suggest that this disorder constitutes about 1% of the total cases of meningitis.[1] Epidemiologic studies show a change in disease pattern from a community-acquired childhood infection to a mainly nosocomially acquired adult illness, particularly in those with defects near the meninges. We report an unusual case of a healthy child with mixed bacterial meningitis due to a *Streptococcus pneumoniae* species and a nontypable strain of *Haemophilus influenzae*.

## Report of a Case

The patient, a 4-year-old girl who was in good health since birth and had an up-to-date immunization history, was seen by her physician after one day of fever, headache, vomiting, and a rapid deterioration in her mental state. She had pronounced nuchal rigidity suggesting meningitis. A lumbar puncture revealed turbid cerebrospinal fluid (CSF) with 440 × $10^6$ leukocytes per liter (0.80 neutrophils, 0.10 lymphocytes, and 0.10 monocytes), a glucose level of less than 1.1 mmol per liter (20 mg per dl) with a serum glucose value of 24.4 mmol per liter (144 mg per dl), and a protein level of 1.46 grams per liter (146 mg per dl). A CSF Gram's stain showed 4+ gram-positive cocci. The patient was transferred to hospital for further management.

(Chokephaibulkit K, Leo YS, Wittek AE: Mixed bacterial meningitis in a 4-year-old girl. West J Med 1995; 162:59-60)

From the Division of Infectious Diseases, Ahmanson Pediatric Center, and the Division of Infectious Diseases, Department of Medicine, Cedars-Sinai Medical Center, University of California, Los Angeles, School of Medicine.

Reprint requests to Kulkanya Chokephaibulkit, MD, University of Tennessee Medical Center at Knoxville, Dept of Pediatrics, Div of Infectious Diseases, 1924 Alcoa Hwy, Knoxville, TN 37920-6999.

On admission the patient was lethargic and disoriented and had intermittent opisthotonic posturing. A regimen of intravenous cefotaxime sodium, 200 mg per kg of body weight per day, and dexamethasone, 0.6 mg per kg per day, was started within 15 minutes, and she was placed in the intensive care unit. Shortly after admission, she became flaccid and showed only minimal response to painful stimuli. Her pupils were equal, but reacted sluggishly to light. Mild papilledema was noted. A brain computed tomographic (CT) scan confirmed the presence of diffuse cerebral edema with compression of the ventricles and cisterns. In addition, findings consistent with pansinusitis were noted. An endotracheal tube was electively inserted for hyperventilation therapy.

Further laboratory tests revealed that the patient had disseminated intravascular coagulation as evidenced by a prothrombin time of 17.2 seconds, a partial thromboplastin time of 47.2 seconds, D-dimer greater than 8,000 ng per ml, and a platelet count of 205 × $10^9$ per liter (205 × $10^3$ per $mm^3$). Her serum sodium level was 126 mmol per liter, potassium 3.5 mmol per liter, and serum osmolarity 270 mmol per kg (270 mOsm per kg), suggestive of the syndrome of inappropriate antidiuretic hormone (ADH) secretion. *Streptococcus pneumoniae* was identified in cultures of blood and CSF specimens obtained on admission. The following day, a nontypable *H influenzae* strain was identified in the same culture of CSF. The patient regained consciousness the next day and showed no further laboratory evidence of disseminated intravascular coagulation or the syndrome of inappropriate ADH secretion.

On the third hospital day, the patient was extubated and remained stable. A follow-up CT scan of the brain showed marked lessening of the cerebral edema. On the fifth day the patient became afebrile. She received intravenous cefotaxime for a total of 14 days, followed by the combination of amoxicillin and clavulanic acid for another seven days because of the CT evidence of sinusitis. The patient continued to show progressive improvement and on day 18 was transferred to a rehabilitation facility with only mild peripheral weakness and a mild residual dysarthria. Her brain-stem auditory evoked potentials and vestibular evoked potentials were within normal limits on discharge. Her residual neurologic abnormalities resolved slowly over several weeks.

## Discussion

The incidence of mixed bacterial meningitis is highly variable, ranging from near 0% to 14%.[2-4] The disease pattern has changed over the past two to three decades from a primarily community-acquired childhood disease to a disease mainly seen in adults, with a high incidence of nosocomial acquisition.[1] Today, mixed bacterial meningitis accounts for about 1% of the total cases of meningitis. Of these, about 90% of the patients suffer from a predisposing condition that can be identified, including recent neurosurgical procedures, indwelling intracranial catheters, malignancy adjacent to the central nervous system axis, disruption of an anatomic barrier such as a neurocutaneous fistula, and posttraumatic CSF leak.[1,5-8]